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A SYSTEMATIC APPROACH TO EVALUATING THE DEVELOPMENT OF THE ECONOMIC SYSTEM

The article discusses the theoretical approach to an economic system's functioning and the systematic approach to analysing the economic system's functioning. It considers three ways of economic system development: extensive, intensive, and innovative. The study defines the principles of innovative system development and investigates the properties of the economic system and its functioning in a competitive environment.

Keywords: systematic approach, economic system, analysis, innovation, economic system development, sustainable development.

Introduction

Research has been conducted by Ukrainian and foreign scholars, resulting in certain developments regarding the direction of the country's economic system. However, these developments do not fully address the issue of constructing a mechanism for transforming the economic system. Therefore, the importance of developing a theoretical and methodological concept for establishing a comprehensive and effective system for managing sustainable development at all levels of the Ukrainian economy is growing.

Designing this concept requires considering the specific regional conditions and the peculiarities of regional economic development.

At the beginning of the 21st century, in developed countries, the prevailing feature of economic development has become the dominance of knowledge as the primary resource for securing competitive positions. The economy of knowledge represents a fundamentally new formation centred on the human pursuit of satisfying needs in a manner that does not harm nature while simultaneously promoting its regeneration. Development based on knowledge is an ongoing process of investing in human capital, forming intellectual potential, and effectively utilising it to foster personal development and the intellectualisation of society.

Literature Review

The extensive use of the term 'system' allows us to conclude that it has deep roots and plays a significant role in modern science, serving as an integral component of contemporary knowledge and a means of investigating all that exists. However, the concept of 'system' pertains to one of the most general and universal definitions. It applies to various objects, phenomena, and processes. Furthermore, this term can have multiple meanings: from a system as a theory –

such as Plato's philosophical system – to a system as a set of norms and rules of behaviour (e.g., legal system and system of moral norms).

The first scientific interpretation of the concept of a 'system' was provided in 1950 by Ludwig von Bertalanffy [1], the founder of general systems theory. He defined a system as a complex of elements interacting with one another. Later, A. Hall and R. Fagen [2] defined a system as a set of objects together with the relationships between those objects and their attributes.

According to B.-Å. Lundvall [3], systems appear as a stable complex of elements interconnected by specific relationships. As a result, more attention is given to existing institutions and structures, while less is focused on qualitative changes in the structure and institutional basis of innovation systems.

Today, 'system' primarily refers to a set or aggregate of objects with a network of relationships between them and their properties. In other words, anything composed of interconnected parts is a system: a machine, an organism, or a collective.

However, it is necessary to distinguish that a system composed of a particular set of interrelated elements (parts) differs from a mere collection of identical but separate elements. Firstly, a system is directed towards achieving specific goals, whereas in a collection of elements, each element may have its objective, and the sum of these objectives may not align with the system's goal. Secondly, a system has a particular structure, which depends on the relationships between its elements, whereas, in a collection, there are no such relationships and thus no structure. Thirdly, a system can self-organise through the synergy of the properties inherent in its elements, a capacity that a collection of elements lacks. Fourthly, a system possesses properties that the individual elements do not have separately. Fifthly, a system has interconnected properties of both wholeness and

separateness, whereas a collection of elements only exhibits properties of separateness. Thus, it is possible to conclude that any system comprises elements, an environment, relationships, and a structure.

An element of the system is a relatively autonomous object, which one cannot further subdivide at this level, which performs particular functions and interconnects with other objects that comprise the system. However, it is worth noting that such division into elements is relative, as it is possible to represent any system as an element of a larger-scale system and regard an element of a system as a relatively autonomous system.

The environment encompasses everything that affects the system, not controlled by it. The impact of the environment on the system is commonly referred to as input, while the system's influence on the environment is called output or the system's response.

Connections between the elements ensure the system's functioning as a whole. A connection involves the transfer of material, energy, or informational components from one object to another and its division into internal (transfer occurs between elements within the system) and external (the output of one system becomes the input for another).

The author agrees with R. Ackoff [4], who summarises the contemporary understanding of a system: a system is a whole not possible to divide into independent parts without losing essential properties or qualities. This statement considers nuances depending on the area of system research (whether it is a biological or an artificially created system) and considers the features of its creation.

Research Aim

The purpose of the research is a systematic approach to the analysis of the development and functioning of the economic system and the determination of the properties of the economic system in the conditions of a competitive environment.

Discussion of Results

In our opinion, it is necessary to investigate, analyse, and provide adequate information about the interaction and functioning of system elements at different levels (for example, on a macroeconomic level, mesoeconomic level, or microeconomic level).

As a result of development and the continuous implementation of innovations, society and the economy are in a transitional state, meaning that their subsystems are constantly being updated and modified. This condition has led to a renewed systemic methodology based on the concepts of 'chaos' and 'transitional processes'.

The further systemic idea development led to the emergence of H. Haken's [5] synergetics concept and the formation of the principle of synergy, which evolved fully in the 1980s. This principle is applied when it is

necessary to investigate efficiency issues, including the outcomes of scientific and technological achievements, social transformations, and the implementation of innovations. Using this principle allows for explaining transitional and unconventional processes, thereby preventing a crisis in the theory of systematicity.

One of the primary, and therefore fundamental, systemic approach attributes is the inadmissibility of considering an object apart from its development. Development is an irreversible, directed, and lawful change of matter and consciousness. As a result, a new quality or state of the object emerges. The laws of development operate objectively by nature, meaning they are independent of our desires for their manifestation. The concept of development pertains not to a specific system but to a particular class of systems, that is, systems that sequentially replace one another while performing the same functions.

Development is a complex process of qualitative change within a system. Philosophical science understands development as irreversible, determined, and directed toward the lawful changes of material and ideal objects, leading to a new quality. The concept of development is linked inextricably to another one of a system and its development. The scientific literature has been advancing the conceptual foundations for ensuring the socio-economic development of large systems based on stability.

From a spatial perspective, development refers to changes in systems across space. The temporal dimension of development involves the emergence of new forms, their struggle against the old, and the transformation of existing forms into new ones. The quality of the transformations occurring in the system development process relates to changes concerning composition, structure, functions, and more. It is important to emphasise that the quality of such transformations has a systemic nature, meaning it is not merely the sum of changes in the system's components.

Attention must go to the source of development, which ensures qualitative changes in the system through the use of substances, energy, and information. A system has two types of sources: the first being those located within the system and the second in the external environment. Every system is multilevel, and the interaction between different levels of the system is one of the factors in its development; that is, the system development process is an inter-level interaction.

Development is the result of several vectors of directed changes, namely:

- external development: when the system expands its sphere of influence;
- internal development: when the system transforms its internal characteristics;
- microdevelopment: the deepening of the system's levels;
- macrodevelopment: when the system increasingly

influences microprocesses.

It is possible to divide the general issues of system development into three categories: spatial, life cycle, and the rate of changes within the system. Spatial issues include preserving, expanding, and utilising the system's living space. Life cycle issues encompass crises and ways to overcome them, unstable development, structural consolidation, the role of external factors in system development, and the selection and formation of an effective development strategy for the system. Issues related to the rate of changes in the system involve the choice between the pace of revolutionary changes and gradual evolutionary changes.

Considering that development is a lawful, directed, and irreversible transition of a system from one state to another, which differs from the first by an increase or decrease in some parameters, sustainable development consists of the system's stability and the stability of its processes. In this context, the system's stability comprises its structural-organisational and functional stability.

System stability refers to its ability to return to a state of equilibrium, most favourable for the system to perform its functions, after being affected by external factors. Stability is the system's capacity to utilise external influences in a way that corrects any deviation from its development trajectory and returns to its original path. Therefore, one can view sustainable development as a consistent and predictable change in the system's state with a high degree of likelihood and ability to withstand adverse external influences.

Stability and instability are two sides of the development process. Any development is a sequence and interaction of stability and instability, and the more complex the system's goal, the more likely it is to encounter situations in which it depends on environmental factors. In such cases, the system increasingly deviates from its initial equilibrium point, seeking a new balance point.

Recently, the focus of research has shifted from a two-dimensional socio-economic system of development to a three-dimensional socio-ecological-economic system. In this system, the social factor has become predominant, as the core element is the transmission of the reproductive potential to satisfy ecological and economic needs from one generation to the next. The foundation of the new type of development is sustainable (continuous) development.

'Sustainable development is a development that meets the needs of the present without compromising the ability of future generations to meet their own needs' [1, p. 12]. This understanding of 'sustainable development' is the starting point for a conceptual approach to addressing global, social, and environmental challenges, whose close interconnection is vital as sustainable development concepts.

Sustainable development is a comprehensive concept that emphasises the necessity of establishing a

balance between meeting the current needs of humanity and protecting future generations' interests, including their need for a safe and healthy environment. This type of development is a managed process grounded in a systemic approach and modern information technologies, which allow for the rapid modelling of various developmental scenarios, highly accurate forecasting of their outcomes, and selecting the most optimal path forward.

The following interconnected aspects of sustainable development are distinguished:

- environmental (transition to balanced natural resource use);
- socio-economic (ensuring economic growth);
- political (formation of civil society, development of democratic institutions);
- demographic (stabilisation of population growth);
- spiritual and cultural (formation of a mindset based on the principles of sustainable development) [1].

Based on the research results, we have identified the theoretical aspects of system development (Fig. 1).

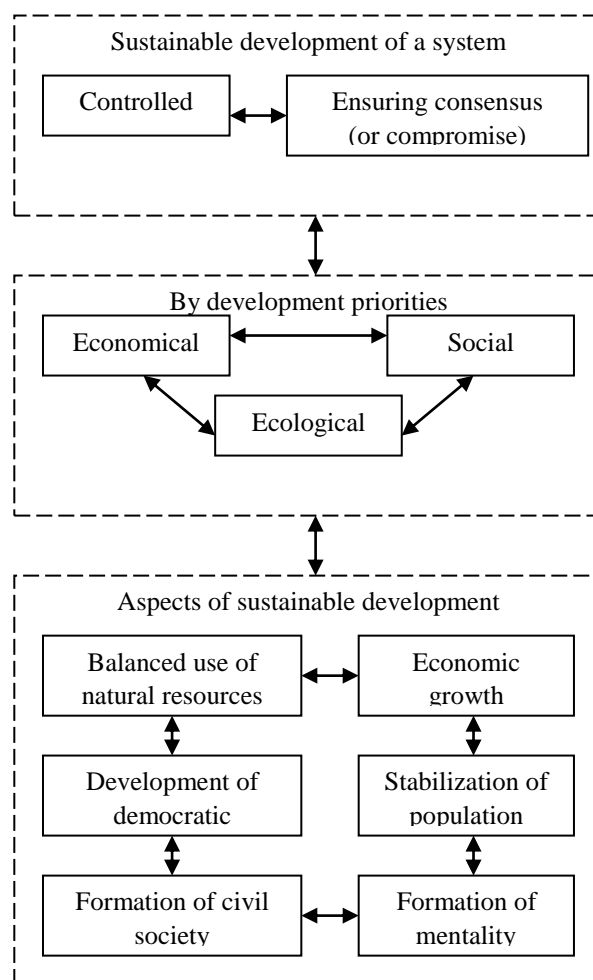


Fig. 1. Theoretical Foundations of Sustainable System Development

In general terms, sustainable development over time, taking into account the main parameters, is represented

as follows:

$$F_t(L; K; N; I) < F_{t+1}(L; K; N; I), \quad (1)$$

where $F_t(L; K; N; I)$ – the function of sustainable development;

L – labour resources;

K – artificially created capital, means of production;

N – natural resources;

I – institutional factor;

$t = 0...n$ – time period.

In this form, sustainable development's function represents an extension of the production function through introducing new yet fundamental parameters, such as natural resources and the institutional factor.

This relationship reflects the need to maintain and increase a specific aggregate production potential over time, primarily determined by three types of capital. Thus, it is possible to reduce natural capital as long as

there is compensation for such reduction by an increase in using artificially created means of production (factories, technologies, infrastructure), improvements in worker qualifications, and other means.

The institutional factor – often overlooked and ignored – is crucial for sustainable development. Cultural traditions, religion, and property institutions, among others, significantly impact the choice of environmental, social, and economic policies.

During the emergence and functioning of the economic system, there used to be two ways of development – extensive and intensive – but these ways have almost exhausted their potential, which is related to their characteristics and properties [5]. The present requires sustainable and efficient development of the economic system. Only the innovative way, i.e., scientific, technical, and technological development, can meet such an approach as a more advanced way of the modern development of the economic system.

Table 1 presents the comparative characteristics of different ways of development [5].

Table 1

Comparative characteristics of development paths of the economic system

Characteristics	Development path		
	extensive	intensive	innovative
Development concept	increase in production volumes	reduce in unit costs	increase in revenue
Market type	seller's market	seller's market and buyer's market	buyer's market
Market coverage	the entire market as a whole	selective segments	selective market segments and niches
Competition	practically absent	mainly price-based	mainly non-price-based
Consumer requests	stable	changeable	sharp differentiation and constant change
Prevailing type of production	massive	serial	small-scale and single-unit production
Ratio of production costs (PC) to sales costs (SC)	PC >> SC	PC ≈ SC	SC > PC
Shares of mental and physical labour in production	PL >> ML	PL > ML	ML > PL
Management approach	administrative	systematic	situational

An economic system embarked on an innovative development path should function by the following principles [1–4].

The following features of economic development determine the nature of the modern economy:

- a manifestation of a clearly defined function of science with the continuous intensification of the processes of social and individual reproduction;
- high fundamental nature of applied technological innovations widely implemented in the economy;
- the ability of the scientific potential to work at a high level of technological requirements rather than

at an average one;

– increased flexibility of organisational and economic forms that combine the efforts of researchers, developers, and marketers into target groups that can provide a sufficiently high commercial and socio-economic effect;

– the presence of a resource and financial environment that has a high capacity for innovation and a capacity for high-risk projects;

– significant influence of public administration in the scientific and technical sphere with simultaneous active role and innovation activity of business entities.

Conclusions

The study of the theoretical aspects of sustainable development based on the scientific works of foreign and domestic scientists and accumulated experience has made it possible to identify interrelated aspects and defining components of the sustainable development process, the main parameters for ensuring such development over time and a set of indicators for harmonious and balanced development. These aspects allow us to consider innovation development at all levels and provide a basis for developing a concept of innovation development management.

Ukraine's economy is a complex systemic and integrated entity in which the economic system operates as an organisational and economic complex, which, in turn, functions as an ordered integral set of productive forces and organisational and economic relations.

The economic system develops under the influence of a large number of interrelated factors and conditions (external and internal), among which the determining role belongs to objective and subjective factor-resources (material, technical, financial, informational, human, technological, organisational, managerial, entrepreneurial, commercial, motivational, incentive, and others).

Today, the main factors of low economic performance in Ukraine are as follows:

- lack of a systematic approach to the use of factor-resources;
- inconsistency in the preparation and use of factor-resources over time;
- lack of an effective system for stimulating and encouraging factor innovations;
- lack of a set of conditions for the need to reproduce fundamentally new goods (works, services) in qualitatively new technical and technological systems;
- low demand for innovative developments of business entities;
- inefficient use of scientific developments and implementation of R&D results in production and other spheres of life.

In the face of intense competition from high-tech enterprises globally, domestic producers urgently need to develop and effectively use their human capital, which is crucial as a resource. The new era of knowledge and highly developed intelligence requires additional attention in society to the use and development of human capital, which we can assess and convert into profit but cannot separate from the person who carries it. Therefore, it is necessary to create conditions for employees that will enable them to reveal their full potential while performing their duties. Only then will it be possible to intensify production, defeat competitors, and maintain the company's market position.

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СИСТЕМНИЙ ПІДХІД ДО ОЦІНКИ РОЗВИТКУ ЕКОНОМІЧНОЇ СИСТЕМИ

О.П. Коюда

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Розкрито сутність системного підходу до функціонування та розвитку економічної системи в сучасних умовах. Визначено, що розвиток великих економічних систем слід розглядати як з погляду просторової, так і часової лінії розвитку.

Запропоновано враховувати, що розвиток економічної системи – це закономірний, спрямований, незворотний перехід системи з одного стану в інший, який відрізняється від першого збільшенням або зменшенням деяких параметрів. Визначено, що стабільність системи складається з її структурно-організаційної та функціональної стабільності. Розглянуто взаємопов'язані аспекти сталого розвитку: екологічний (перехід до збалансованого природокористування); соціально-економічний (забезпечення економічного зростання); політичний (формування громадянського суспільства, розвиток демократичних інституцій); демографічний (стабілізація зростання населення); духовно-культурологічний (формування менталітету на принципах стійкого розвитку). Також виокремлені теоретичні аспекти розвитку системи: збалансоване природокористування, розвиток демократичних інституцій, економічне зростання, формування громадянського суспільства та формування менталітету.

На підставі розглянутих аспектів сталого розвитку системи було запропоновано загальну функцію сталого розвитку в часі з урахуванням основних параметрів, яка відображає необхідність збереження та збільшення у часі певного агрегатного виробничого потенціалу, що визначається переважно трьома видами капіталу. Наведено порівняльну характеристику шляхів розвитку економічної системи та властивості економічної системи та її функціонування в умовах конкурентного середовища.

Проведені дослідження дозволили визначити чинники ефективності функціонування як макроекономічної, так і мікроекономічної систем в сучасному конкурентному середовищі, а також виокремити взаємопов'язані аспекти та визначальні складові процесу сталого розвитку, основні параметри щодо забезпечення такого розвитку в часі та сукупність індикаторів для гармонічного і збалансованого розвитку.

Ключові слова: системний підхід, економічна система, аналіз, нововведення, розвиток економічної системи, сталий розвиток.